

To: Ms. Nancy Beller-Simms, Program Manager, Economics and Human Dimensions
NOAA Office of Global Programs
From: Charles W. Howe and John D. Wiener, University of Colorado

Re: Annual Progress Report, November 2001, NOAA Grant No. NA97GP0407,
"Exploratory Assessment of the Potential for Improved Water Resources Management by
Increased Use of Climate Information in Three Western States and Selected Tribes"

Dear Ms. Beller-Simms:

This report summarizes the activities of the three research teams of the "Three States Project" during the second year of the project. We are pleased to report that a gratifying number of the relationships established with client groups in the first year have proven durable and productive, and each team has carried out numerous additional interviews and data collection during the year. Since interviews are continuing, some completed interviews have not been included in this report

Please contact us with any questions you may have, including requests for copies of the detailed interview reports in each of the States. Since the New Mexico team will not be participating in year three activities, their final report will be prepared and distributed within the next several months. Sincerely,

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Year 2 Progress Report, NOAA Grant No. NA97GP0407, "Exploratory Assessment of the Potential for Improved Water Resources Management by Increased Use of Climate Information in Three Western States and Selected Tribes"

Note: this report builds on the reports distributed a year ago at the OGP/HD review of the Project. Those reports establish full context and descriptions of the interview methods, decision calendar construction, protocols for contact with Tribes, and detailed weather/climate data requests from client groups. These reports can be furnished electronically upon request.

Summary of Findings from Second Year Interviews.

The following points of difference, amplification, or particular note have emerged from the revisit interviews conducted so far. The full set will be synthesized when the rest of the interviews have been conducted.

Highlights from Utah.

Highlights from Zuni Pueblo. New staff have become involved and raised several new issues, including dam safety, private water resources management and coordination, aquifer recharge, range management, and drought contingency planning. The range management issues are not very different from those noted in Colorado last year, reinforcing the sense of commonality of range issues. Previously raised issues, including the revegetation of the Zuni Heaven area, Pueblo municipal water management, construction planing and fire management were emphasized again.

Highlights from Navajo Nation. New issues raised included the need for data and modeling to support the drought contingency plan, echoing previous complaints about the lack of NWS and weather station coverage of this vast area. Dam safety and reservoir management were also raised as concerns (there are 15 dams in Arizona alone). The data gaps were worsened by the loss of 5 USGS stream gauges, which complicates safety as well as conservation management in reservoirs. Previously raised issues in irrigation and grazing management again were raised. Perhaps the most scientifically intriguing challenge is the possibility of working with a "virtual climate division" [what in heck is this?], and development of a standardized precipitation index. Considering the data gaps and the high value of better climate information for resource management, there may be valuable opportunities for development of a joint Navajo-NOAA program of monitoring and modeling.

Highlights from the Ute Mountain Ute Farm and Ranch Enterprise. The extremely sophisticated farm management operation here has linked its weather station to COAGMET, the Colorado Agricultural Meteorology network. The local monitoring is state-of-the-art, and this enterprise is committed to increasing its use of technology in support of soil and crop management. Frost-date forecasts were useful but forecasting and planning for evapotranspiration remains a goal. Wind data at surface levels is needed. There is an opportunity here for cooperative programs.

Highlights from Southern Ute. The Southern Ute administration and its BIA associates are technically adept and are familiar with a variety of climate and weather products already available on internet, as reported last year. They were also interested in the possibility of a “virtual climate division” for more useful statistical analyses of available data. They raised a new concern for endangered fish species that would increase potential value of climate information for reservoir and irrigation management. There was also discussion of creating a fax transmission service for emergency alerts and warnings.

Highlights From Colorado.

. There has been some change in the use of climate information, but primary interest remains in more localized weather. The National Weather Service Forecast Service Office in Pueblo has added some easy access to good hydrology information, in a fine job of public service (credited primarily to Dr. Larry Waldrop).

Preliminary results to show some interesting contrasts in what information is wanted. For example, one agricultural advisor dislikes being forced to resort to text in the prognostic discussions while another person in reservoir management uses them daily and especially appreciates them as an archive. A diversity of forms and products continues to be called for.

New requests included USDA interest in archive radar images for rapid damage assessment and verification of where storms did damage. This was a new twist on the earlier request for storm tracks and patterns of events as an aid to forecast interpretation and application.

Two major legal and institutional changes are underway, opening new ways in which climate information could be more widely used. First, there is a plan to "re-operate" the Arkansas River reservoirs and perhaps add space in Pueblo Reservoir as well. Climate forecasts could be helpful in designing new operating rules. Second, an Arkansas River Water Bank Pilot Project is beginning, with draft regulations currently in progress. We are actively participating in the process by providing literature review and suggesting alternative water bank designs. It is clear that climate information will play an important role in the design and operation of the emerging water bank. Applications of climate information may also increase in response to the Kansas v. Colorado lawsuit and the imposition of salinity standards.

Three frequently recurring issues are flood safety and stream gauging, localization, and evapotranspiration. The flood safety and management issue concerns the lags in reporting from existing gauges and the lack of gauges in some useful places. The goal is safety, and then ability to capture and store any possible "wind falls". The safety issue, however, involves threats to the whole ditch system as well as directly from the river. The localization issue concerns the ability to apply forecasts to all time intervals to specific locations (it remains difficult to foresee solutions). The forecasting of evapotranspiration is also widely desired by reservoir operators as well as the irrigators.

Highlights from New Mexico.

During year 2 of the Three States study, the New Mexico team completed the interview process with Middle Rio Grande water managers. The set of interviewees was expanded during the second year, in place of the second visits planned in the initial proposal. New Mexico participants' requests regarding climate information products were of a programmatic nature, and NOAA responses were unavailable during the second year, so that second interviews were not indicated. A plan for a Pueblo Climate Workshop was developed but foregone, due to delays in implementation carrying the date past the original time frame. In addition, the questions put by Pueblo staff in the organizing interviews were of such a technical nature as to be unanswerable by our own staff.

Additional interviews during year 2 included the City of Albuquerque conservation program and water resources staff, Jean Witherspoon and John Stomp; Tod Stevenson of New Mexico Game and Fish Department, now responsible for New Mexico's endangered species activities; John Carangelo, mayordomo of the La Joya acequia, the only remaining acequia in the Middle Rio Grande, who discussed his use of climate information products as an irrigator and as a regional water planner; and Steve Harris, of Alliance for the Rio Grande Heritage, an environmental group involved in endangered species and restoration activities in the Rio Grande.

Previewing the report of these discussions, we offer this observation: Our expectation was that the interviews would elicit responses regarding the timing, format, geographic focus, etc. of climate information products. Instead, participants, expressing great interest in and understanding of climate information products, were very explicit that these products have limited importance in a decision or policy context given the current understanding of how weather events translate into hydrologic and soil moisture conditions. The region is very active in seeking to improve that understanding, and participants made specific requests for help in those activities. Data needs were also stressed—USGS stream gages and Snotel sites are being withdrawn, just as the need for their information becomes sharper.

Necessary Revisions of Planned Activities in Year Two.

The original design for this research called for re-visiting informants in the Three States and Selected Tribes with revised climate information products in response to requests that were identified in the first year. It has been difficult to fully complete this process because of a lack of resources in CDC to prepare many requested new information products. We therefore have had to delay some return visits until a wider range of revised products is available. The Climate Diagnostics Center collaborators' second year report is appended to this report.

In Utah, a temporary solution was to provide improved information and access through the assistance of CDC staff member Andrea Ray who joined Drs. McCool and Smoak for presentation and work-shops on existing information as well as re-interviews on climate information use and desires.

In New Mexico, the team has been somewhat hampered by the political situation in water management and the possibility of litigation involving in response to Endangered Species protection measures contemplated in response to increasing stress on the Rio Grande (see Special Issue of the Natural Resources Journal (Vol.39 No.1, 1999): Coping with Scarcity in the Rio Grande/Rio Bravo Drainage Basin: Lessons to be Learned from the Droughts of 1993-1996 and Ward, F.A., et al., 2001, "Institutional Adjustments for Coping with Prolonged and Severe Drought in the Rio Grande Basin", New Mexico Water Resources Research Institute Technical Completion Report No. 317, Las Cruces: New Mexico State University.)

In the Arkansas Valley of Colorado rather than delay too long, we continued to meet with our informants and will continue through the third year as well.

List of Year Two Interviews (for listing of first year interviews, please see synthesis report from year one, previously provided):

UTAH TEAM (Dr. Dan McCool and Dr. Gregory Smoak, with Andrea Ray from Climate Diagnostics Center): The Tribe revisits were partly the re-interviews on climate information use, and also partly exposition of available materials, from Andrea Ray of Climate Diagnostics Center, with potential direct users of the information involved. This format was intended to further the third year focus of the Utah team on developing effective information transfer and user contact with Tribes, and they were pleased with the results and interaction.

Navajo Nation Water Resources Department, April 12: Dan Guevara, hydrologist; Tom Watson, hydrologist technician; Lincoln Lydell, hydrologist technician; Ernest Kito, engineering technician, water resources and dam safety; Bernadette Tsosie, hydrologist; Jerome Bekis, hydrological technician; Robert Kirk, hydrologist.

Southern Ute Indian Tribe and Bureau of Indian Affairs Southern Ute Agency, September 13, Jim Formea, Head of Division of Water Resources, Reggie Howe, Division of Water Resources, Michael Stancampiano, Superintendent BIA Southern Ute Agency, Kenneth Caveney, Supervisory Civil Engineer, BIA Southern Ute Agency, Gerry George, Fire Management Officer, BIA Southern Ute Agency.

Ute Mountain Ute Farm and Ranch Enterprise, September 14, Paul Evans, General Manager, and John Hecht, Crop Quest Agronomic Services, consultant to Farm and Ranch Enterprise.

Zuni Pueblo Department of Natural Resources, April 13: Kirk Bemis, Head of Water Resources section, hydrologist; Andreas Cheama, technician, water and vegetation; Troy Lucio, technician, environmental protection; Wilber Haskie, supervising range technician; Albert Chopito, watershed technician.

COLORADO TEAM (Dr. Charles Howe and Dr. John Wiener): The Arkansas Valley revisits were concerned with the year two objectives of reviewing climate information in use and changes since previous discussions, and in furtherance of the year three focus on applications of climate information in the Arkansas Water Bank Pilot Program, legislated in Spring 2001 and signed by the Governor in June 2001

Colorado Interviews (omitting conferences, tour, other visits and phone calls/e-mails):

Lorenz Sutherland, USDA Natural Resources Conservation Service, La Junta CO and Robert Appel, USDA Resource Conservation and Development, Lamar CO, May 16

Wayne Whittaker, Secretary, Catlin Canal Co., Rocky Ford, CO, May 17

Ron Aschermann, Secretary, Rocky Ford Ditch, near Rocky Ford, CO, May 17

Manny Torrez, Manager, Fort Lyon Canal Co., Las Animas, CO, May 18

Julia Davis, U.S. Army Corps of Engineers, John Martin Dam and Reservoir, Hasty CO, May 18

Thomas Ley, Hydrologist, Office of the State Engineer, Division 2, Arkansas River Basin, Pueblo, CO, May 14

Scott Cotton, Small Acreage and Range specialist, fire safety, USDA-Colorado State University Co-Operative Agricultural Extension, Pueblo, CO, May 14

Tom Musgrove, Bureau of Reclamation, Pueblo Reservoir, Pueblo, CO, May 15

James Valliant, Irrigation specialist, USDA-Colorado State University Co-Operative Agricultural Extension Service, Rocky Ford, CO, May 15.

NEW MEXICO TEAM:

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